

**Pomona Lake
1999 Water Quality Report**

1. General.

a. **Project location.** Pomona Dam is located approximately 6 miles northwest of Pomona, Kansas, at river mile 8.3 on the One Hundred and Ten Mile Creek, a tributary of the Marais des Cygnes River. The project watershed encompasses 322 square miles in east-central Kansas.

b. **Authorized project purposes.** The primary project purposes are flood control, low flow supplementation, and water quality; equally important, however, are its fish and wildlife resources, recreation, and water supply benefits.

c. Pertinent data.

Pools	Surface Elevation (ft. above m.s.l.)	Current Capacity (1,000 A.F.)	Surface Area (acres)	Shoreline (miles)
Flood Control	1,003	176.1	8,522	
Multipurpose	974	64.2*	3,871	52
Inactive		20.9**		
Total		240.3		

Total Drainage Area: 322 sq. miles

Average Annual Inflow: 143,721 acre-feet

* Based on most recent hydrographic survey

** Contained in multipurpose pool

2. Activities and studies of the year.

Monthly herbicide and nutrient sampling was conducted by lake project personnel, with technical and analytical support from PM-PR-W, April-September 1999 at one inflow station, three lake stations (two depths), and the outlet. Nutrient samples were shipped to the Chemical and Materials Quality Assurance Laboratory (CMQAL) in Omaha for analysis while the herbicide samples were shipped to the PM-PR-W laboratory for analysis of four of the most commonly occurring herbicides by the ELISA (enzyme linked immunosorbent assay) method. Ten percent of the herbicide samples were shipped to the CMQAL to be analyzed by Gas Chromatography (GC) for quality control purposes. All generated data were entered in excel spreadsheets as an interim to the EPA national water quality data management system, NEW

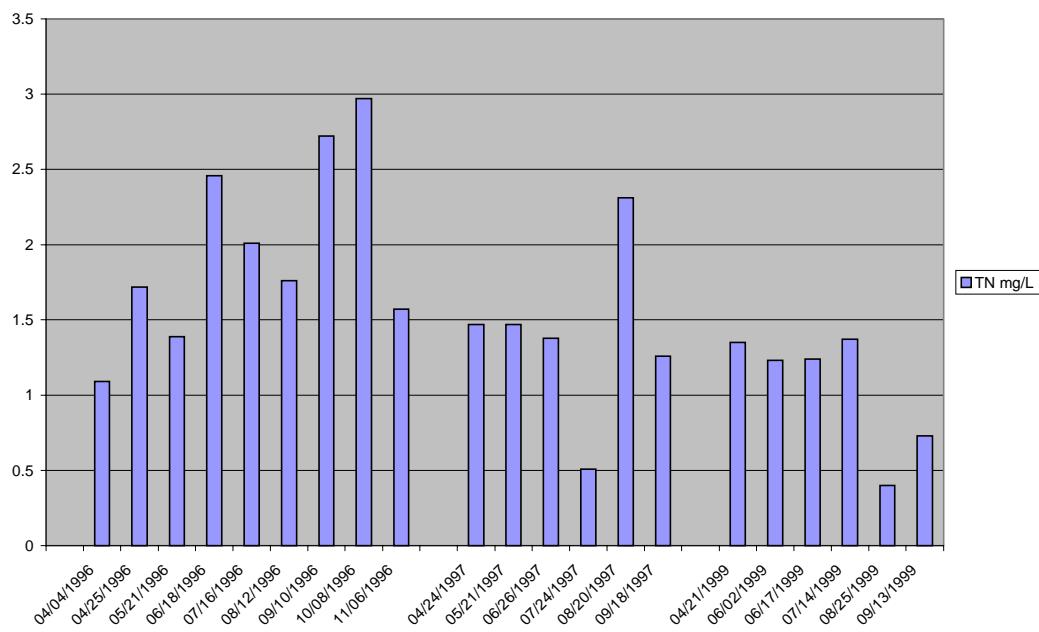
STORET, which is still in the developmental stage. Table 1 at the end of this report includes all the available nutrient and herbicide data for the past years from 1996-1999.

The OF-PO is to be commended for its continued support of water quality monitoring of Pomona Lake and its tributaries. The OF-PO personnel deserving special recognition include Messrs. David White and Lew Ruona.

3. Existing conditions.

FIGURE 1: PO-11

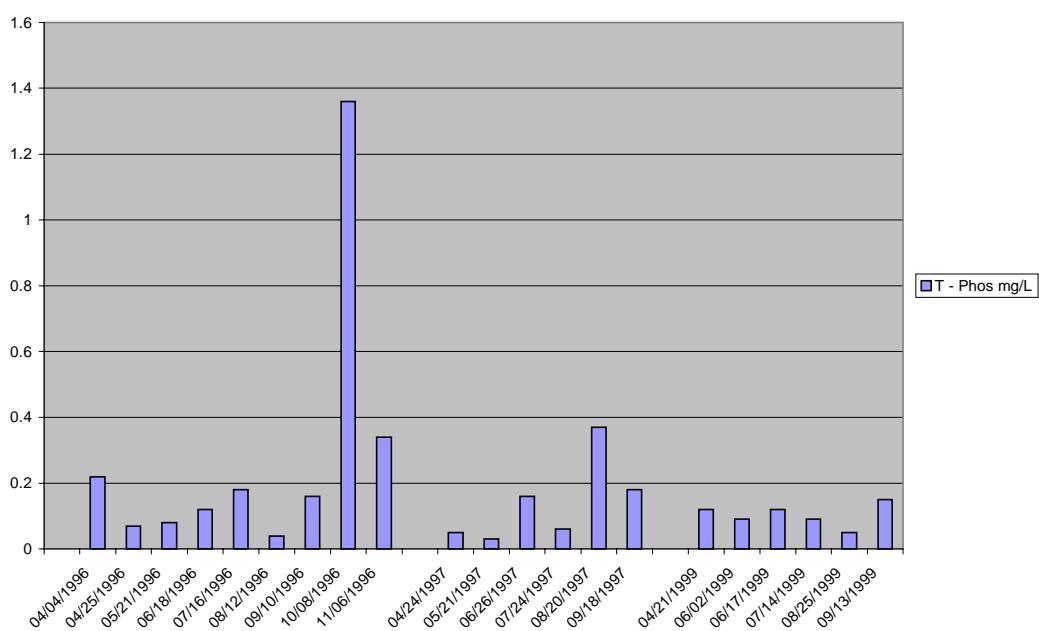
a. Inflow.
Dragon Creek south of Burlingame, Kansas was sampled monthly from April-September 1999. The average total nitrogen (i.e., $\text{NH}_3 + \text{NO}_2 + \text{NO}_3 + \text{TKN}$) concentration was above eutrophic levels ($> 1 \text{ mg/L}$) at



1.05 mg/L, which continues to demonstrate the elevated, long-term nutrient load to the

stream. Figure 1 shows the trend for total nitrogen concentrations over three of the past four years. As can be seen from this graph, levels have typically been above eutrophic levels with spikes occurring during

FIGURE 2: PO-11



high inflows such as June 1996. The total phosphorus (TP) mean concentration, 0.10 mg/L, also remains at the Environmental Protection Agency (EPA) suggested stream criterion of 0.1 mg/L for the protection of aquatic ecosystems. The stream has been characterized by moderately eutrophic phosphorus levels over the period of record (figure 2).

Within the six-month sampling period of April-September for herbicides, atrazine and metolachlor were the most prevalent. The mean and maximum for atrazine were 3.47 ug/L and 17.3 ug/L, respectively. The June run-off was above the EPA

maximum contaminant level (MCL) standard for drinking water supplies of 3 ug/L. The trend for three of the past four years is shown in figure 3. The mean and maximum for metolachlor were 0.94 ug/L and 4.56 ug/L, respectively. Cyanazine and alachlor were detected in smaller quantities and were well below the suggested EPA standard for drinking water of 1 ug/L and 2 ug/L, respectively. To date the EPA has not set standards for metolachlor.

b. Lake.

The three

FIGURE 3: PO-11

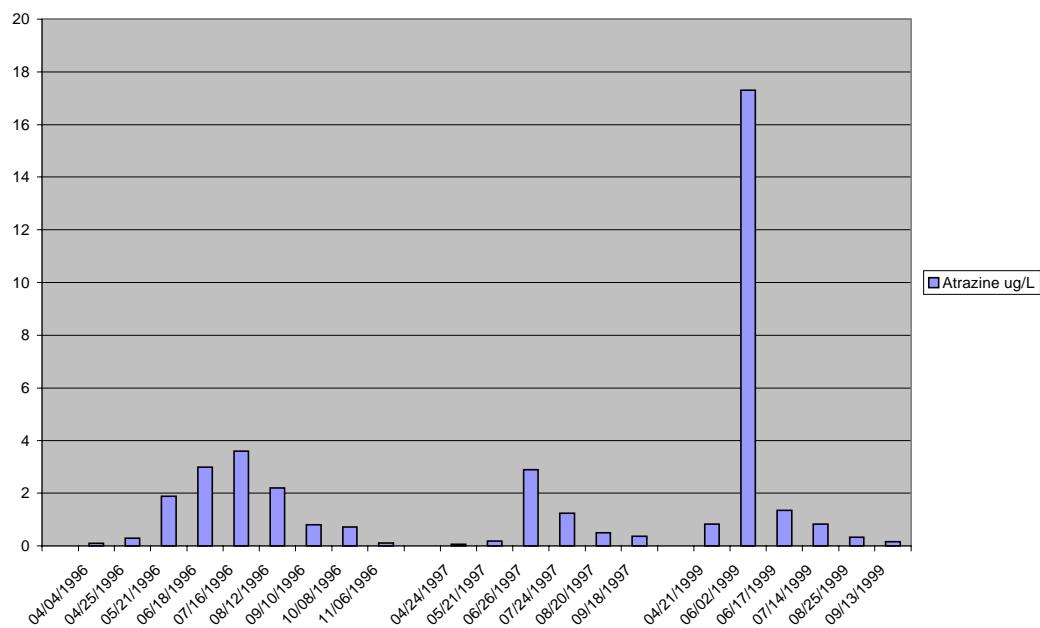
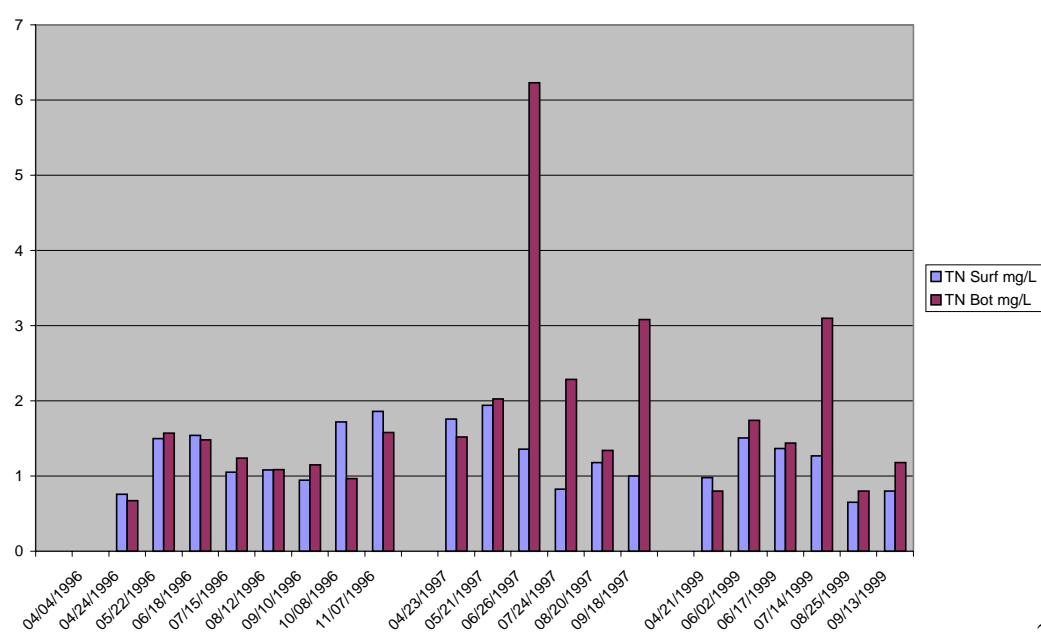


FIGURE 4: PO-3



stations sampled during the six-month sampling period were downlake near the dam (station PO-3), midlake (station PO-7), and the Ten Mile Creek arm (station PO-12). As can be seen in figures 4, 5, and 6, nutrient concentrations

FIGURE 5: PO-7

were typical of the impoundment over the period of record. These three graphs show the relationship between surface and bottom concentrations for three of the past four years.

Concentrations within the

water column do not appear to be very uniform. The high spikes can be attributed to high inflows and temperature differences between surface and bottom waters. The 1999 mean and maximum total nitrogen concentrations in the surface waters were 1.10 mg/L and 1.51 mg/L, respectively, at PO-3, 1.29 mg/L and 1.88 mg/L, respectively, at

PO-7, and 1.10 mg/L and 1.59 mg/L, respectively, at PO-12. Mean and maximum total nitrogen

concentrations in the bottom waters differed; PO-3, 1.51 mg/L and 3.10 mg/L, respectively;

PO-7, 1.47 mg/L and 1.89 mg/L, respectively; and PO-12, 1.49 mg/L and 2.79 mg/L, respectively. Total phosphorus concentrations contributed to the eutrophic nature of the lake

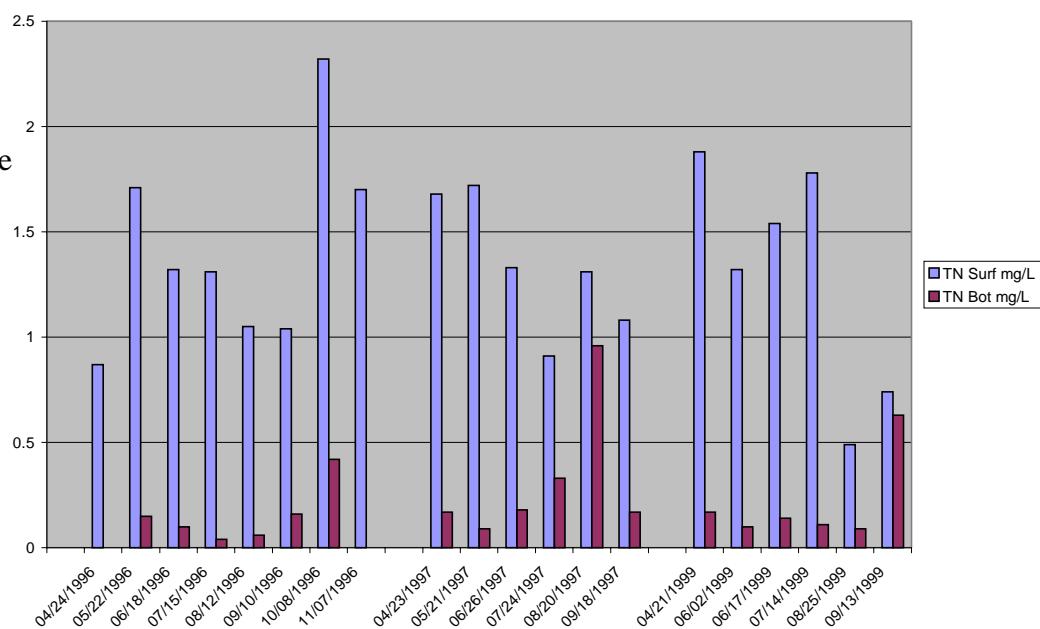
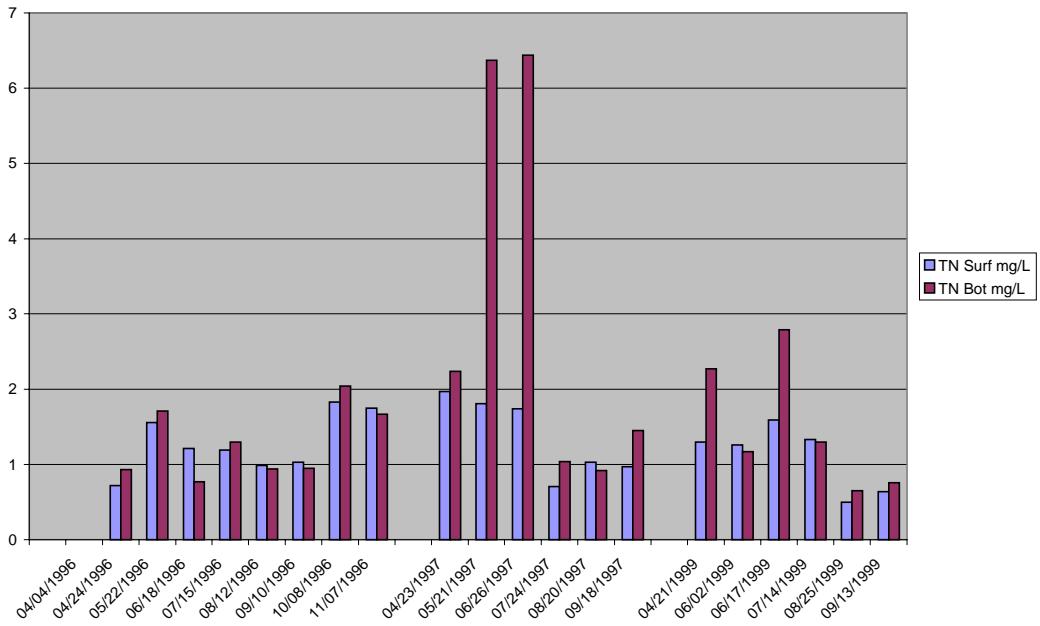


FIGURE 6: PO-12



with mean and maximum concentrations in the surface waters of 0.09 mg/L and 0.11 mg/L, respectively, at PO-3, 0.12 mg/L and 0.15 mg/L,

respectively, at PO-7, and 0.10 mg/L and 0.13 mg/L, respectively at PO-12.

Mean total phosphorus

concentrations in the bottom

waters were fairly consistent with the concentration in the surface waters. The ratios of total nitrogen to total phosphorus in each section of the reservoir indicate phosphorus is the limiting nutrient. Figures 7, 8, and 9 show concentrations at the surface and bottom depths throughout the lake from 1996-1999. Again, the high

spikes can be attributed to high inflows and temperature differences between surface and bottom waters.

These nutrient levels continue to be within moderate to highly eutrophic ranges.

FIGURE 7: PO-3

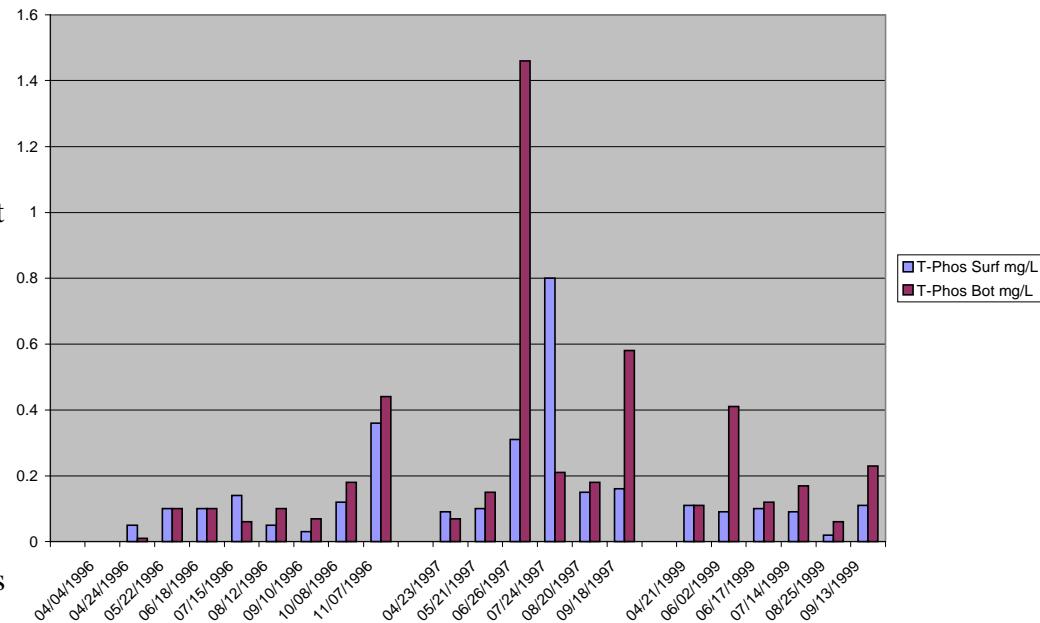


FIGURE 8: PO-7

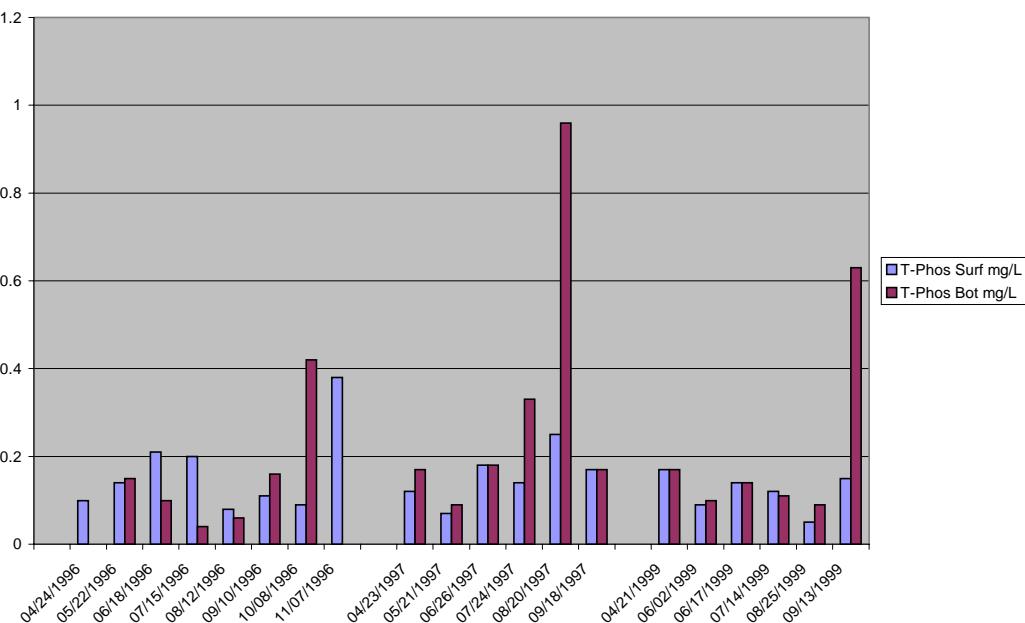
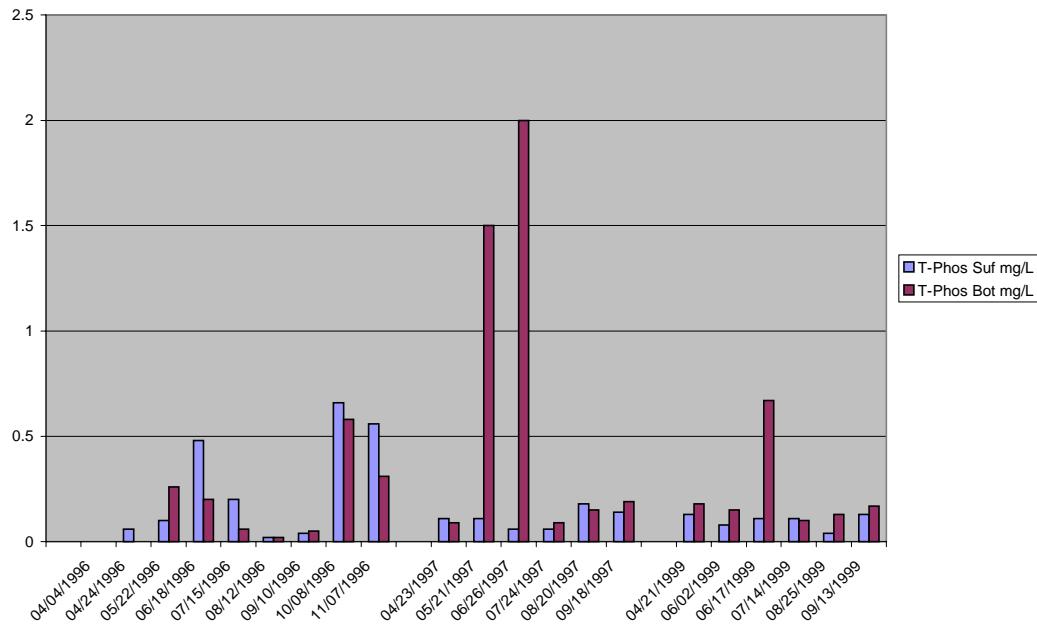


FIGURE 9: PO-12

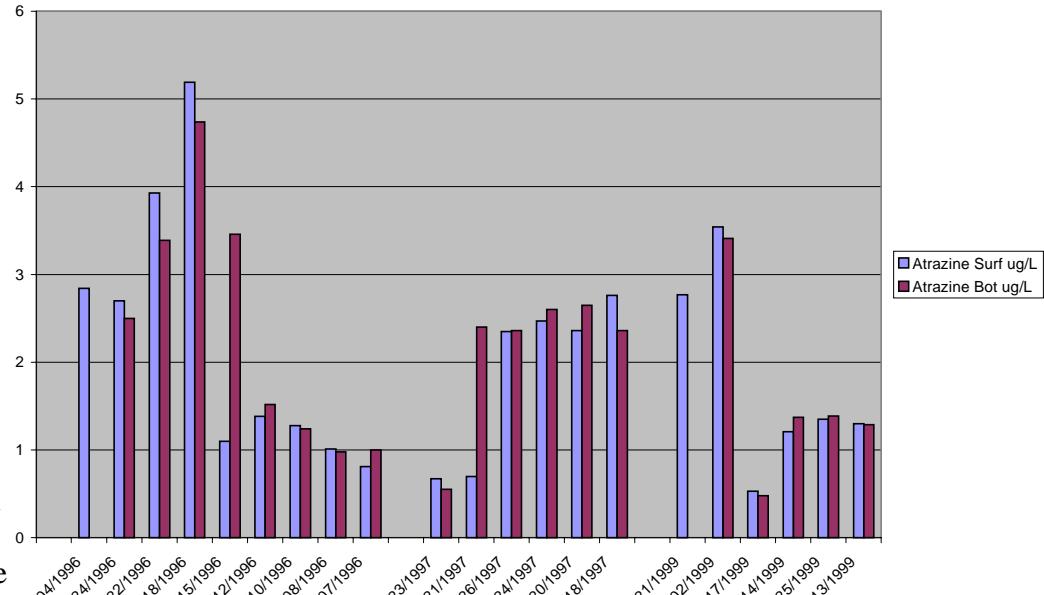


In the monthly surveys during April-September, the four herbicides (atrazine, metolachlor, alachlor, and cyanazine) were detected. Higher concentrations of atrazine were apparent in the uplake area during the spring run-off period of April and early June with concentrations decreasing as the herbicide moved through the

FIGURE 10: PO-3

lake. Atrazine was detected in 100% of the 1999 samples. Concentrations of atrazine exceeding the MCL of 3 ug/L occurred in only 22% of the samples. The mean and maximum atrazine concentrations in the surface waters of the lake were as follows,

1.78 ug/L and 3.54 ug/L (PO-3); 2.42 ug/L and 4.40 ug/L (PO-7); and 1.64 ug/L and 3.54 ug/L (PO-12), respectively. Bottom mean and maximum atrazine concentrations for the above



areas were 1.59 ug/L and 3.41 ug/L; 2.20 ug/L and 4.61 ug/L; and 3.05 ug/L and 10.00 ug/L, respectively.

Figures 10, 11, and 12 show the trend for atrazine for the years 1996-1999. As can be seen from these graphs, high concentrations occur throughout the lake in early spring during the high run-off periods and then

level off. For the most part concentrations are uniform throughout the water column. Metolachlor was detected in all of the 1999 samples. The mean and maximum metolachlor concentrations in the surface waters were as follows,

1.19 ug/L and 1.39 ug/L (PO-3); 1.18 ug/L and 1.46 ug/L (PO-7); and 1.33 ug/L and 1.75 ug/L (PO-12), respectively.

Bottom mean and maximum concentrations for the above areas were 1.22 ug/L and 1.44 ug/L; 1.25 ug/L and 1.48 ug/L; and

1.59 ug/L and 3.73 ug/L, respectively. Although detected in 100% of the 1999 samples, neither alachlor nor cyanazine exceeded established criteria.

FIGURE 11: PO-7

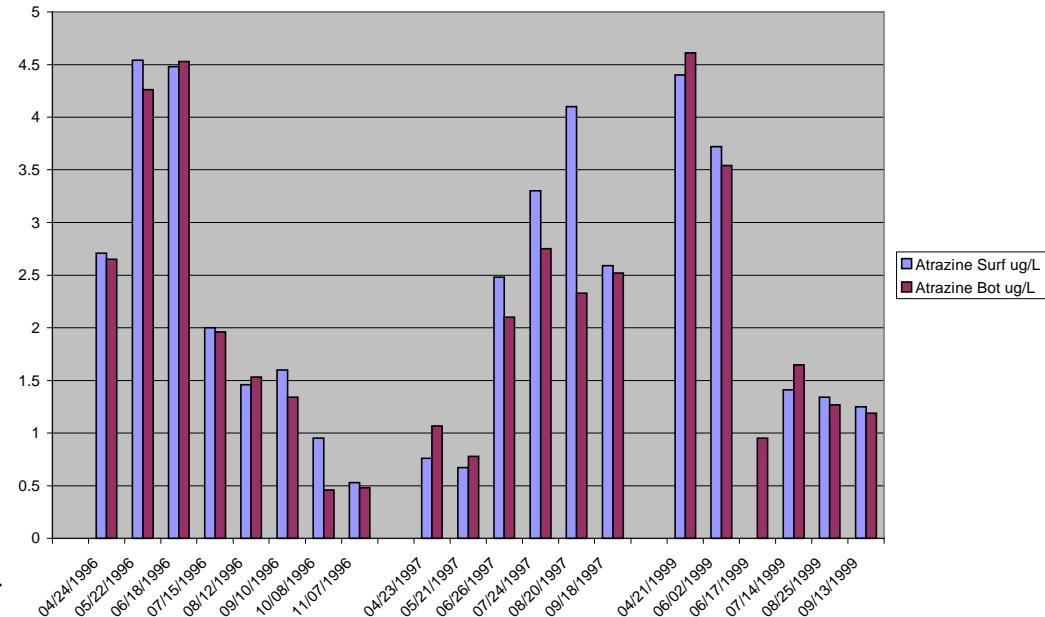
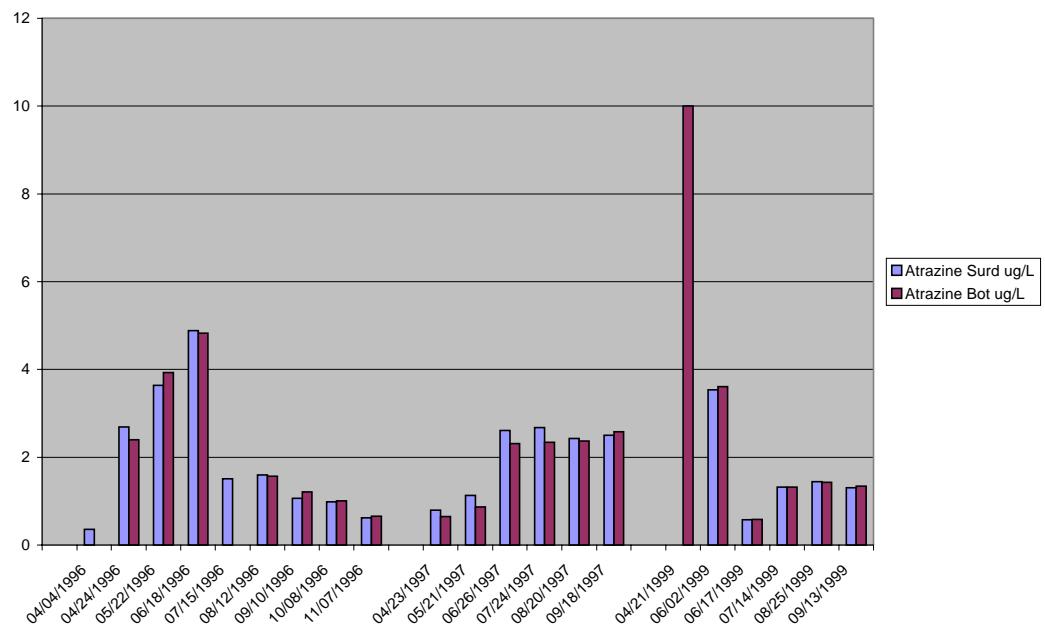


FIGURE 12: PO-12



c. **Outflow.** The present sampling indicated the water quality conditions in the outlet (PO-

2) continue to be satisfactory. The nutrient levels remained moderate with mean total nitrogen and total phosphorus concentrations of 1.09 mg/L and 0.12 mg/L, respectively. Again, as shown in figures 13, and 14, concentrations are higher during the high run-off periods.

Total nitrogen and total phosphorus concentrations remained fairly consistent within the three years represented by the graphs. The mean and maximum concentrations for atrazine were 2.24 ug/L and 3.41 ug/L, respectively, for the 1999 survey periods. Two of the samples exceeded the MCL of 3 ug/L for atrazine. Figure 15 shows the trend for the years 1996-1999. As can be seen from this graph, 1999 concentrations remained fairly consistent with the other two years shown. The mean and maximum concentrations for metolachlor were 1.20 ug/L and 1.29 ug/L, respectively. Although detected in 100% of the 1999 samples, neither alachlor nor cyanazine exceeded established criteria.

FIGURE 13: PO-2

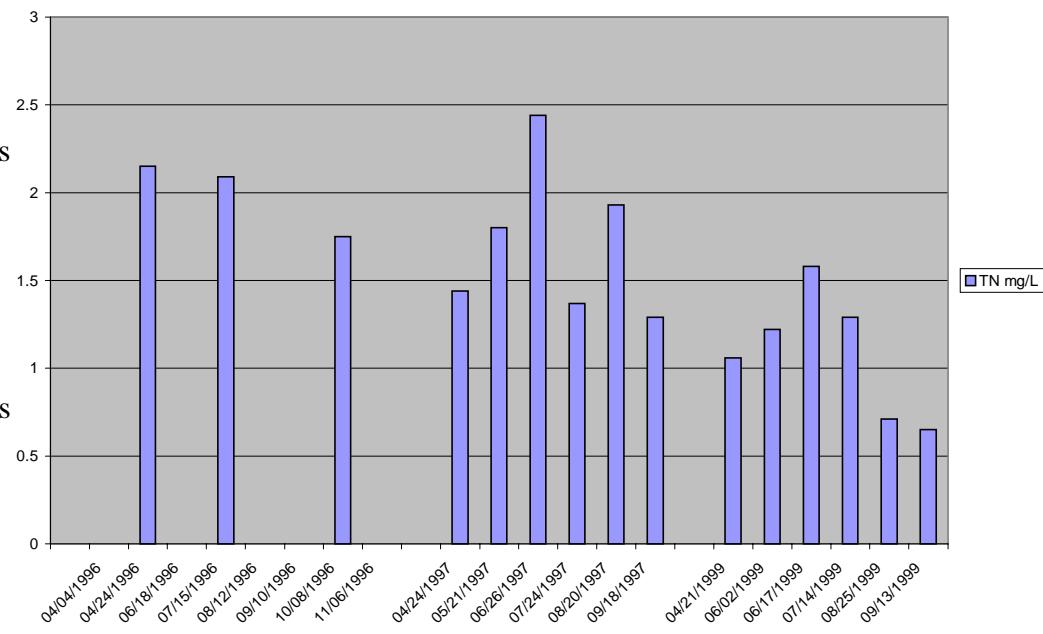


FIGURE 14: PO-2

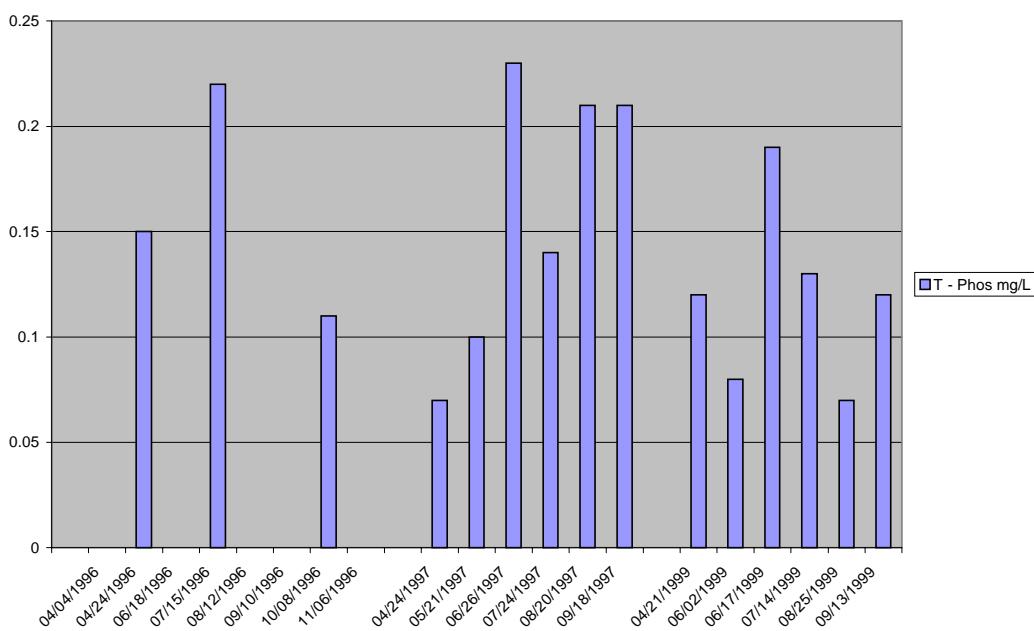
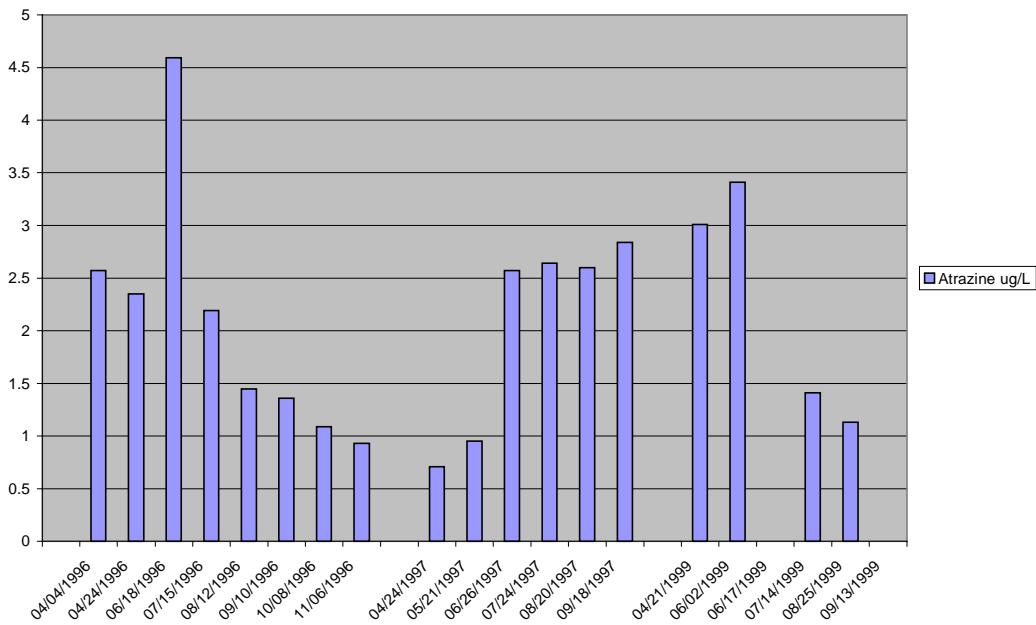


FIGURE 15: PO-2



4. Future conditions.

The water quality of Pomona Lake is moderately good overall as evidenced by its excellent sport fishery of crappie, walleye, channel catfish, and white bass. The parameters most responsible for the lake's water quality will continue to be turbidity, suspended solids, and nutrients; however, with the increased detection of herbicides in the reservoir, seemingly the greatest potential threat is pesticide loading derived from agricultural run-off from row crops within the watershed. Atrazine concentrations for the period of record (1988-1999) show a continued exceedence of the EPA criterion of 1 ug/L for the protection of aquatic life. The concentrations in many periods exceed the EPA MCL of 3 ug/L, the maximum permissible level of a contaminant in public drinking water. Past monitoring has shown that the pesticide levels pose a continuing threat to the drinking water supplies for the project and recreation areas and to the rural water districts, since present water treatment is inadequate to significantly reduce these pollutants in the finished water unless activated carbon filtration is provided.

5. Recommendations.

With the current staffing and funding levels, the water quality surveillance program for Pomona Lake will continue to be limited in 2000. Routine monthly pesticide and nutrient sampling should be conducted by Project personnel with logistic and analytical support from PM-PR-W. The extension of the Lower Osage River Basin Model to include the Upper Osage River Basin should be attempted in-house or contracted out in 2001. The District should enlist the other state and Federal agencies in developing a cooperative water quality monitoring and abatement program for Pomona Lake and its watershed in 2001 similar to the one currently underway for Hillsdale Lake and the Big Bull watershed.

TABLE 1: POMONA LAKE DATA 1996-1999

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
PO - 11	0.1	04/04/1996	1511	0.11	<0.05	0.07	<0.04	<0.02	0.79	0.3	1.09	0.22	0.19
	0.1	04/25/1996	1115	0.3	<0.05	0.07	0.06	0.24	0.68	0.8	1.72	0.07	0.01
	0.1	05/21/1996	1350	1.89	0.21	1.26	0.15	0.04	0.75	0.6	1.39	0.08	<0.01
	0.1	06/18/1996	1355	2.99	0.2	0.91	0.16	0.04	2.02	0.4	2.46	0.12	<0.01
	0.1	07/16/1996	1120	3.6	<0.1	2	<0.1	0.03	1.38	0.6	2.01	0.18	0.03
	0.1	08/12/1996	1435	2.2	<0.1	0.8	<0.1	0.15	0.91	0.7	1.76	0.04	0.01
	0.1	09/10/1996	1210	0.8	<0.1	0.4	<0.1	0.03	1.59	1.1	2.72	0.16	<0.01
	0.1	10/08/1996	1220	0.72	<0.05	0.33	<0.04	<0.02	0.67	2.3	2.97	1.36	0.06
	0.1	11/06/1996	1315	0.12	<0.05	0.05	<0.04	0.43	0.14	1	1.57	0.34	0.05
Average				1.41	0.21	0.65	0.12	0.14	0.99	0.87	1.97	0.29	0.06
PO - 11	0.1	04/24/1997	1115	0.06	<0.05	0.06	<0.04	<0.02	0.57	0.9	1.47	0.05	0.02
	0.1	05/21/1997	1104	0.19	0.15	0.07	<0.04	0.03	0.54	0.9	1.47	0.03	0.01
	0.1	06/26/1997	1410	2.9	1.36	1.58	0.14	<0.02	0.08	1.3	1.38	0.16	0.06
	0.1	07/24/1997	1100	1.24	0.64	0.42	0.13	<0.02	0.01	0.5	0.51	0.06	0.03
	0.1	08/20/1997	0845	0.51	0.14	0.89	0.06	0.06	0.55	1.7	2.31	0.37	0.19
	0.1	09/18/1997	1100	0.37	0.07	0.31	0.04	<0.02	0.06	1.2	1.26	0.18	0.05
Average				0.88	0.47	0.56	0.09	0.05	0.30	1.08	1.40	0.14	0.06
PO - 11	0.1	04/21/1999	1122	0.82	0.07	0.27	0.05	U	1.06	0.29	1.35	0.12	0.06
	0.1	06/02/1999	1030	17.3	0.37	4.56	0.27	0.07	0.8	0.36	1.23	0.09	0.05
	0.1	06/17/1999	1115	1.36	0.1	0.32	0.13	0.13	0.37	0.74	1.24	0.12	0.04
	0.1	07/14/1999	1100	0.83	0.2	0.3	0.1	0.04	0.83	0.5	1.37	0.09	0.01
	0.1	08/25/1999	0940	0.33	0.08	0.11	<0.04	0.17	U	0.23	0.4	0.05	0.03
	0.1	09/13/1999	0955	0.17	<0.05	0.07	<0.04	0.11	0.02	0.6	0.73	0.15	0.05
Average				3.47	0.16	0.94	0.14	0.10	0.62	0.45	1.05	0.10	0.04
PO - 2	0.1	04/04/1996	1132	2.57	0.13	0.52	0.16						
	0.1	04/24/1996	1200	2.35	0.12	0.43	0.15	0.56	0.69	0.9	2.15	0.15	0.02
	0.1	06/18/1996	1448	4.59	0.97	2.22	0.25						
	0.1	07/15/1996	1306	2.19	0.72	<0.05	0.05	0.05	1.54	0.5	2.09	0.22	0.23
	0.1	08/12/1996	1554	1.45	0.52	1.49	0.07						
	0.1	09/10/1996	1125	1.36	0.48	1.48	0.06						
	0.1	10/08/1996	1110	1.09	0.57	1.07	0.05	0.03	0.42	1.3	1.75	0.11	0.05
	0.1	11/06/1996	1231	0.93	0.22	0.95	<0.04						
Average				2.07	0.47	1.17	0.11	0.21	0.88	0.90	2.00	0.16	0.10
PO - 2	0.1	04/24/1997	1150	0.71	<0.05	0.57	0.06	<0.02	0.74	0.7	1.44	0.07	0.02
	0.1	05/21/1997	1136	0.95	0.52	0.55	0.07	0.11	0.59	1.1	1.8	0.1	0.06
	0.1	06/26/1997	1450	2.57	0.53	1.77	0.13	0.06	1.28	1.1	2.44	0.23	0.06
	0.1	07/24/1997	1132	2.64	1.09	1.33	0.23	0.37	0.1	0.9	1.37	0.14	0.08
	0.1	08/20/1997	0930	2.6	0.71	1.09	0.5	0.39	0.04	1.5	1.93	0.21	0.07
	0.1	09/18/1997	1020	2.84	0.42	0.55	0.15	<0.02	0.29	1	1.29	0.21	0.14
Average				2.05	0.65	0.98	0.19	0.23	0.51	1.05	1.71	0.16	0.07

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
PO - 2	0.1	04/21/1999	1030	3.01	0.77	1.25	0.13	U	0.61	0.45	1.06	0.12	0.05
	0.1	06/02/1999	0945	3.41	0.69	1.29	0.16	U	0.98	0.24	1.22	0.08	0.07
	0.1	06/17/1999	1035				0.09	0.72	0.77	1.58	0.19	0.12	
	0.1	07/14/1999	1015	1.41	1.11	1.26	0.11	0.14	0.74	0.41	1.29	0.13	0.04
	0.1	08/25/1999	0905	1.13	0.66	1	0.07	0.17	0.28	0.26	0.71	0.07	0.06
	0.1	09/13/1999	0920				U	0.26	0.39	0.65	0.12	0.04	
Average				2.24	0.81	1.20	0.12	0.13	0.60	0.42	1.09	0.12	0.06
PO - 3	0.1	04/04/1996	1200	2.84	0.17	0.68	0.21						
	0.1	04/24/1996	1015	2.7	0.21	0.53	0.19	0.21	0.05	0.5	0.76	0.05	0.01
	0.1	05/22/1996	1000	3.93	0.51	1.83	0.18	0.57	0.33	0.6	1.5	0.1	0.05
	0.1	06/18/1996	1145	5.19	1.06	1.79	0.14	0.03	0.81	0.7	1.54	0.1	0.09
	0.1	07/15/1996	1100	1.1	0.65	0.5	<0.04	0.02	0.73	0.3	1.05	0.14	0.04
	0.1	08/12/1996	1115	1.38	0.58	1.87	0.15	<0.02	0.58	0.5	1.08	0.05	0.04
	0.1	09/10/1996	0845	1.28	0.45	1.45	0.08	0.22	0.13	0.6	0.95	0.03	<0.01
	0.1	10/08/1996	1330	1.01	0.41	1.05	<0.04	<0.02	0.62	1.1	1.72	0.12	0.02
	0.1	11/07/1996	1000	0.81	0.23	0.95	<0.04	0.57	0.39	0.9	1.86	0.36	0.06
Average				2.25	0.47	1.18	0.16	0.27	0.46	0.65	1.31	0.12	0.04
PO - 3	0.1	04/23/1997	1030	0.67	0.32	0.67	0.06	<0.02	0.76	1	1.76	0.09	0.05
	0.1	05/21/1997	0840	0.7	0.47	0.54	0.1	0.1	0.74	1.1	1.94	0.1	0.05
	0.1	06/26/1997	1220	2.35	0.59	1.67	0.2	<0.02	0.56	0.8	1.36	0.31	0.22
	0.1	07/24/1997	0830	2.47	1.11	1.3	0.22	<0.02	0.03	0.8	0.83	0.8	0.04
	0.1	08/20/1997	0820	2.36	0.5	0.85	0.13	<0.02	0.08	1.1	1.18	0.15	0.04
	0.1	09/18/1997	0851	2.76	0.46	0.53	0.15	<0.02	0.2	0.8	1	0.16	0.07
Average				1.89	0.58	0.93	0.14	0.10	0.40	0.93	1.35	0.27	0.08
PO - 3	0.1	04/21/1999	0740	2.77	0.7	1.1	0.14	U	0.42	0.56	0.98	0.11	0.05
	0.1	06/02/1999	0710	3.54	0.97	1.39	0.17	0.04	0.98	0.49	1.51	0.09	0.05
	0.1	06/17/1999	0810	0.53	0.76	1.37	0.07	0.07	0.92	0.38	1.37	0.1	0.08
	0.1	07/14/1999	0850	1.21	1.07	1.35	0.08	0.05	0.89	0.33	1.27	0.09	0.04
	0.1	08/25/1999	0740	1.35	0.71	0.91	0.1	0.1	0.29	0.26	0.65	0.02	0.02
	0.1	09/13/1999	0750	1.3	0.6	1.02	0.08	U	0.25	0.55	0.8	0.11	0.03
Average				1.78	0.80	1.19	0.11	0.07	0.63	0.43	1.10	0.09	0.05
PO - 3	11	04/24/1996	1026	2.5	0.17	0.62	0.21	<0.02	0.07	0.6	0.67	0.01	
	13	05/22/1996	1013	3.39	0.43	1.62	0.19	0.61	0.36	0.6	1.57	0.1	0.05
	13	06/18/1996	1158	4.74	1.1	1.91	0.15	0.19	0.79	0.5	1.48	0.1	0.16
	12	07/15/1996	1112	3.46	0.73	<0.05	0.11	0.06	0.58	0.6	1.24	0.06	
	12	08/12/1996	1127	1.52	0.68	1.8	0.13	<0.02	0.59	0.5	1.09	0.1	0.04
	12.5	09/10/1996	0858	1.24	0.61	1.32	0.08	0.19	0.16	0.8	1.15	0.07	<0.01
	12	10/08/1996	1342	0.98	0.43	1.23	<0.04	0.33	0.34	0.3	0.97	0.18	
	13.5	11/07/1996	1014	1	0.27	0.86	0.53	0.38	0.4	0.8	1.58	0.44	0.06
Average				2.35	0.55	1.34	0.20	0.29	0.41	0.59	1.22	0.13	0.08

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
PO - 3	11.5	04/23/1997	1042	0.55	0.21	0.57	0.05	<0.02	0.72	0.8	1.52	0.07	0.06
	12	05/21/1997	0852	2.4	<0.1	0.7	<0.1	0.09	0.74	1.2	2.03	0.15	0.05
	12	06/26/1997	1232	2.36	0.65	1.77	0.14	0.12	0.61	5.5	6.23	1.46	0.08
	12	07/24/1997	0842	2.6	0.72	1.26	0.17	0.37	0.02	1.9	2.29	0.21	0.08
	12	08/20/1997	0832	2.65	0.79	0.82	0.17	0.11	0.13	1.1	1.34	0.18	0.06
	12	09/18/1997	0903	2.36	0.35	0.48	0.14	0.13	0.35	2.6	3.08	0.58	0.19
Average				2.15	0.54	0.93	0.13	0.16	0.43	2.18	2.75	0.44	0.09
PO-3	13.5	04/21/1999	0754					U	0.42	0.38	0.8	0.11	0.04
	15	06/02/1999	0725	3.41	0.9	1.44	0.17	0.08	0.98	0.68	1.74	0.41	0.07
	15	06/17/1999	0825	0.48	0.77	1.37	0.06	0.02	0.93	0.49	1.44	0.12	0.07
	13.5	07/14/1999	0904	1.37	1.07	1.33	0.11	0.22	0.7	2.18	3.1	0.17	0.05
	11	08/25/1999	0751	1.39	0.53	0.99	0.07	0.2	0.3	0.3	0.8	0.06	0.03
	15	09/13/1999	0805	1.29	0.53	0.97	0.06	0.36	0.24	0.58	1.18	0.23	0.04
Average				1.59	0.76	1.22	0.09	0.18	0.60	0.77	1.51	0.18	0.05
PO - 7	0.1	04/24/1996	1330					0.14	0.03	0.7	0.87	0.1	0.01
	0.1	04/24/1996	1336	2.71	0.21	0.61	0.18				0		
	0.1	05/22/1996	1200	4.54	0.88	2.2	0.24	0.38	0.73	0.6	1.71	0.14	0.06
	0.1	06/18/1996	1400	4.48	0.46	2.03	0.19	0.11	0.71	0.5	1.32	0.21	0.14
	0.1	07/15/1996	1330	2	0.5	0.31	0.05	<0.02	0.61	0.7	1.31	0.2	0.06
	0.1	08/12/1996	1315	1.46	0.58	1.28	0.07	0.02	0.13	0.9	1.05	0.08	0.01
	0.1	09/10/1996	1115	1.6	0.3	1.7	<0.1	0.03	0.01	1	1.04	0.11	<0.01
	0.1	10/08/1996	1030	0.95	0.29	0.71	<0.04	<0.02	0.92	1.4	2.32	0.09	0.02
	0.1	11/07/1996	1145	0.53	0.19	0.7	<0.04	0.34	0.36	1	1.7	0.38	0.07
	Average				2.28	0.43	1.19	0.15	0.17	0.44	0.85	1.26	0.16
PO - 7	0.1	04/23/1997	1145	0.76	0.18	0.62	0.07	0.02	0.86	0.8	1.68	0.12	0.06
	0.1	05/21/1997	0940	0.67	0.23	0.48	0.05	0.02	0.7	1	1.72	0.07	0.04
	0.1	06/26/1997	1315	2.48	0.71	1.84	0.14	<0.02	0.53	0.8	1.33	0.18	0.08
	0.1	07/24/1997	0930	3.3	<0.1	<0.1	<0.1	0.2	0.01	0.7	0.91	0.14	0.03
	0.1	08/20/1997	0840	4.1	0.53	0.93	0.12	<0.02	0.31	1	1.31	0.25	0.05
	0.1	09/18/1997	0932	2.59	0.24	0.49	0.16	<0.02	0.18	0.9	1.08	0.17	0.07
Average				2.32	0.38	0.87	0.11	0.08	0.43	0.87	1.34	0.16	0.06
PO - 7	0.1	04/21/1999	0900	4.4	1.65	1.25	0.22	0.02	1.12	0.74	1.88	0.17	0.08
	0.1	06/02/1999	0740	3.72	0.85	1.46	0.16	0.09	0.89	0.34	1.32	0.09	0.06
	0.1	06/17/1999	0915					0.07	0.87	0.6	1.54	0.14	0.09
	0.1	07/14/1999	0935	1.41	1.09	1.24	0.14	0.11	0.76	0.91	1.78	0.12	0.04
	0.1	08/25/1999	0822	1.34	0.97	0.95	0.07	0.07	0.2	0.22	0.49	0.05	0.02
	0.1	09/13/1999	0825	1.25	0.58	1.01	0.08		U	0.21	0.53	0.74	0.15
Average				2.42	1.03	1.18	0.13	0.07	0.68	0.56	1.29	0.12	0.06

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
PO - 7	3	04/24/1996	1333	2.65	0.13	0.46	0.11	<0.02	0.02	0.6	0.62	<0.01	
	2.5	05/22/1996	1203	4.26	0.64	1.78	0.19	0.23	1.71	0.6	2.54	0.15	0.07
	3	06/18/1996	1403	4.53	0.45	2	0.18	0.1	1.57	0.3	1.97	0.1	0.15
	2	07/15/1996	1332	1.96	0.54	<0.05	0.06	<0.02	0.57	0.5	1.07	0.04	
	2	08/12/1996	1317	1.53	0.59	1.77	0.11	0.05	0.07	0.8	0.92	0.06	0.02
	2.5	09/10/1996	1118	1.34	0.68	1.52	0.1	0.03	0.01	1.1	1.14	0.16	<0.01
	3	10/08/1996	1033	0.46	0.06	0.26	<0.04	0.87	0.39	0.8	2.06	0.42	
	3.5	11/07/1996	1149	0.48	0.2	2.11	<0.04	0.52	0.35	1	1.87	<0.01	0.07
Average				2.15	0.41	1.41	0.13	0.30	0.59	0.71	1.52	0.16	0.08
PO - 7	10	04/23/1997	1155	1.07	0.46	0.45	0.09	0.09	0.83	1.8	2.72	0.17	0.14
	6	05/21/1997	0946	0.78	0.34	0.56	0.06	0.04	0.73	1.1	1.87	0.09	0.04
	6	06/26/1997	1321	2.1	0.73	1.75	0.14	<0.02	0.55	1.1	1.65	0.18	0.06
	6	07/24/1997	0936	2.75	0.95	1.08	0.21	0.02	0.01	0.7	0.73	0.33	0.06
	6	08/20/1997	0846	2.33	0.52	0.96	0.14	0.24	0.2	3.2	3.64	0.96	0.08
	6	09/18/1997	0938	2.52	0.36	0.52	0.13	0.02	0.06	1.3	1.38	0.17	0.06
Average				1.93	0.56	0.89	0.13	0.08	0.40	1.53	2.00	0.32	0.07
PO - 7	7	04/21/1999	0907	4.61	1.84	1.33	0.17	0.03	1.14	0.72	1.89	0.17	0.07
	10	06/02/1999	0750	3.54	0.82	1.42	0.17	U	0.89	0.47	1.36	0.1	0.07
	8	06/17/1999	0923	0.95	0.81	1.48	0.09	0.13	0.83	0.58	1.54	0.14	0.08
	7	07/14/1999	0942	1.65	1.06	1.32	0.11	0.08	0.77	0.57	1.42	0.11	0.04
	6	08/25/1999	0828	1.27	0.49	1.18	0.09	0.17	0.19	0.22	0.58	0.09	0.03
	7	09/13/1999	0832	1.19	0.49	0.77	0.06	0.02	0.12	1.88	2.02	0.63	0.07
Average				2.20	0.92	1.25	0.12	0.09	0.66	0.74	1.47	0.21	0.06
PO - 12	0.1	04/04/1996	1336	0.36	<0.05	0.12	<0.04						
	0.1	04/24/1996	1230	2.69	0.19	0.57	0.2	0.2	0.02	0.5	0.72	0.06	0.01
	0.1	05/22/1996	1100	3.64	0.64	1.99	0.17	0.72	0.14	0.7	1.56	0.1	0.05
	0.1	06/18/1996	1315	4.88	0.8	1.74	0.14	0.03	0.78	0.4	1.21	0.48	0.1
	0.1	07/15/1996	1200	1.51	0.65	<0.05	<0.04	<0.02	0.69	0.5	1.19	0.2	0.13
	0.1	08/12/1996	1235	1.6	0.3	2.2	<0.1	0.03	0.36	0.6	0.99	0.02	0.02
	0.1	09/10/1996	1015	1.07	0.43	1.45	0.08	0.03	0.2	0.8	1.03	0.04	<0.01
	0.1	10/08/1996	1130	0.98	0.5	1.01	0.04	0.02	0.51	1.3	1.83	0.66	0.01
	0.1	11/07/1996	1045	0.62	0.28	0.99	<0.04	0.46	0.39	0.9	1.75	0.56	0.05
Average				1.93	0.47	1.26	0.13	0.21	0.39	0.71	1.29	0.27	0.05
PO - 12	0.1	04/23/1997	1105	0.8	<0.1	<0.1	<0.1	<0.02	0.77	1.2	1.97	0.11	0.04
	0.1	05/21/1997	0915	1.13	0.77	0.82	0.08	0.21	0.7	0.9	1.81	0.11	0.04
	0.1	06/26/1997	1245	2.61	0.64	1.46	0.15	0.27	0.47	1	1.74	0.06	0.05
	0.1	07/24/1997	0900	2.68	0.69	1.06	0.2	<0.02	0.01	0.7	0.71	0.06	0.03
	0.1	08/20/1997	0856	2.43	0.63	0.84	0.15	0.02	0.11	0.9	1.03	0.18	0.05
	0.1	09/18/1997	0910	2.5	0.44	0.55	0.14	0.11	0.06	0.8	0.97	0.14	0.05
Average				2.03	0.63	0.95	0.14	0.15	0.35	0.92	1.37	0.11	0.04

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
PO - 12	0.1	04/21/1999	0820					U	0.73	0.57	1.3	0.13	0.05
	0.1	06/02/1999	0805	3.54	0.89	1.47	0.17	0.04	0.89	0.33	1.26	0.08	0.08
	0.1	06/17/1999	0850	0.58	0.77	1.75	0.08	0.2	0.89	0.5	1.59	0.11	0.08
	0.1	07/14/1999	0915	1.32	1.08	1.41	0.11	0.06	0.77	0.5	1.33	0.11	0.02
	0.1	08/25/1999	0800	1.44	0.62	1.04	0.08	0.08	0.24	0.18	0.5	0.04	0.05
	0.1	09/13/1999	0813	1.31	0.57	0.99	0.07	U	0.19	0.45	0.64	0.13	0.04
Average				1.64	0.79	1.33	0.10	0.10	0.62	0.42	1.10	0.10	0.05
PO - 12	4	04/24/1996	1234	2.4	0.14	0.49	0.18	<0.02	0.03	0.9	0.93	<0.01	
	6.5	05/22/1996	1107	3.93	0.82	1.85	0.23	0.83	0.38	0.5	1.71	0.26	0.06
	6	06/18/1996	1321	4.83	1.24	1.83	0.15	0.09	0.68	<0.1	0.77	0.2	0.2
	5	07/15/1996	1205					0.02	0.78	0.5	1.3	0.06	
	6	08/12/1996	1241	1.57	0.67	1.78	0.1	0.04	0.4	0.5	0.94	0.02	0.03
	6	09/10/1996	1021	1.21	0.52	1.49	0.08	0.03	0.12	0.8	0.95	0.05	<0.01
	7	10/08/1996	1137	1.01	0.49	1.26	<0.04	0.48	1.06	0.5	2.04	0.58	
	7.5	11/07/1996	1053	0.66	0.22	1	<0.04	0.49	0.38	0.8	1.67	0.31	0.06
Average				2.23	0.59	1.39	0.15	0.28	0.48	0.64	1.29	0.21	0.09
PO - 12	10.5	04/23/1997	1116	0.65	0.25	0.61	0.05	<0.02	0.74	1.5	2.24	0.09	0.08
	9	05/21/1997	0924	0.87	0.46	0.71	0.06	0.11	0.66	5.6	6.37	1.5	0.17
	9	06/26/1997	1254	2.31	0.72	1.71	0.08	0.04	0.7	5.7	6.44	2	0.18
	9	07/24/1997	0909	2.34	0.68	1.12	0.17	0.36	0.08	0.6	1.04	0.09	0.05
	9	08/20/1997	0905	2.37	0.5	0.89	0.11	<0.02	0.12	0.8	0.92	0.15	0.1
	9	09/18/1997	0919	2.58	0.42	0.49	0.14	0.05	0.1	1.3	1.45	0.19	0.05
Average				1.85	0.51	0.92	0.10	0.14	0.40	2.58	3.08	0.67	0.11
PO - 12	7.5	04/21/1999	0828	10	1.23	3.73	0.2	0.06	1.45	0.76	2.27	0.18	0.07
	9	06/02/1999	0814	3.61	0.78	1.39	0.15	0.06	0.7	0.41	1.17	0.15	0.05
	10	06/17/1999	0900	0.59	0.8	1.3	0.05	0.1	0.75	1.94	2.79	0.67	0.15
	7.5	07/14/1999	0923	1.32	0.96	1.26	0.12	0.07	0.76	0.47	1.3	0.1	0.02
	8	08/25/1999	0808	1.43	0.46	0.93	0.09	0.21	0.2	0.24	0.65	0.13	0.03
	7	09/13/1999	0820	1.34	0.54	0.9	0.07	U	0.19	0.57	0.76	0.17	0.04
Average				3.05	0.80	1.59	0.11	0.10	0.68	0.73	1.49	0.23	0.06